Liebert

Keeping Business in Business

Nfinity™

Power System

208 V / 240 V 60Hz

4 to 16 kVA

User Manual

English

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS.

This manual contains important instructions that should be closely followed during installation and maintenance of this UPS unit and during the installation and replacement of power and battery modules.

This product is designed for Commercial / Industrial use only. This product is not intended for use with life support and other U.S. FDA designated "critical" devices. Maximum load must not exceed that shown on the UPS rating label. See Limited Warranty.

WARNING: Lethal voltages may be present within this unit even when it is apparently not operating. Observe all cautions and warnings in this manual. Failure to do so MAY result in serious injury or death. Never work alone.

Observe the following precautions when working with batteries:

- **CAUTION:** DO NOT dispose of battery modules in a fire; the battery module may explode.
- **CAUTION:** DO NOT open or mutilate batteries; released electrolyte is harmful to skin and eyes, and may be toxic.
- **CAUTION:** A battery can present a risk of electrical shock and high short circuit current. The following precautions should be observed when working on batteries:
  - Remove watches, rings or other metal objects.
  - Use tools with insulated handles.
- **CAUTION:** Lead-acid batteries contain hazardous toxic materials. Handle, transport, and recycle in accordance with local regulations.

This UPS is designed for use on a properly grounded (earthed), 208/240 VAC, 60Hz supply, and is to be installed by qualified personnel.

ELECTROMAGNETIC COMPATIBILITY - The *Nfinity*™ UPS complies with the limits for a Class A digital device, pursuant to Part 15 of FCC rules. These limits provide reasonable protection against harmful interference in a commercial environment. This device generates, uses, and radiates radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operating this device in a residential area is likely to cause harmful interference, which the user must correct at their own expense.

Operate the UPS in an indoor environment only in an ambient temperature range of 0°C to +40°C (32°F to +104°F). Install it in a clean environment, free from conductive contaminates, moisture, flammable liquids, gasses, or corrosive substances.

Turn the UPS off and isolate the UPS before cleaning. Use only a soft cloth, never liquid or aerosol cleaners. Keep the front and rear vents free of dust accumulation that could restrict airflow.

Never block or insert any object into the ventilation holes or other openings.

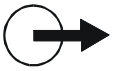
This UPS contains user replaceable modules. No attempts should be made to access the interior of any module. See troubleshooting section on module replacement.

Glossary of Symbols

Risk of Electrical Shock

Indicates Caution
Followed by Important Instructions

AC Input


AC Output

Requests the user to consult the manual

Indicates the unit contains a valve-regulated lead acid battery

Recycle

DC Voltage

Equipment Grounding Conductor

Bonded to ground

AC Voltage

OFF

ON

Standby

No Telecommunication Connection

Locked Position

Unlocked Position

Contact Closure Signals

Serial Communications

Introduction

General Description
Modes of Operation
Major Components

General Description

Congratulations on your purchase of Liebert's *Nfinity*™ Uninterruptible Power System. As with every Liebert product, we stand behind our quality. If you have any questions concerning this UPS, please feel free to contact your local sales representative, or call the appropriate Technical Support number listed in the back of this manual.

To ensure proper installation and operation of this unit, please read this manual thoroughly.

SYSTEM DESCRIPTION

The Liebert *Nfinity* Power System is a modular UPS intended for use with workstations, servers, network, telecom or other sensitive electronic equipment. It provides continuous, high-quality AC power to your equipment, protecting it from any power disturbance due to blackouts, brownouts, surges or noise interference.

The *Nfinity* modular UPS was designed to provide maximum system availability to business critical equipment. *Nfinity* is also an easily adaptable UPS system. By simply installing additional power or battery modules you can expand your current system capacity or extend your back-up runtime.

Nfinity has a comprehensive user interface that can be configured according to the user's preference. It also informs the user of details on the status of the UPS, and keeps a log of events.

FEATURES:

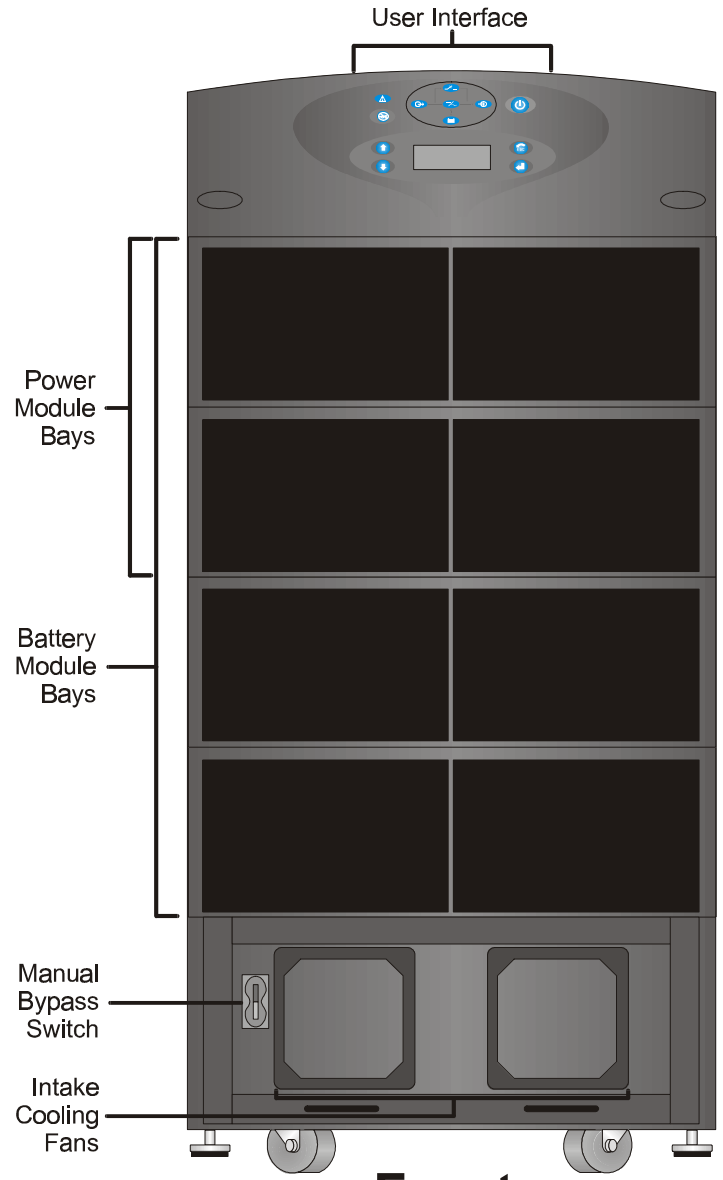
- Up to 16 kVA of modular back-up power
- Continuous power conditioning
- A user-friendly interface for custom configuration
- Continuous system monitoring
- Warning alarms and event logs

STANDARD COMPONENTS:

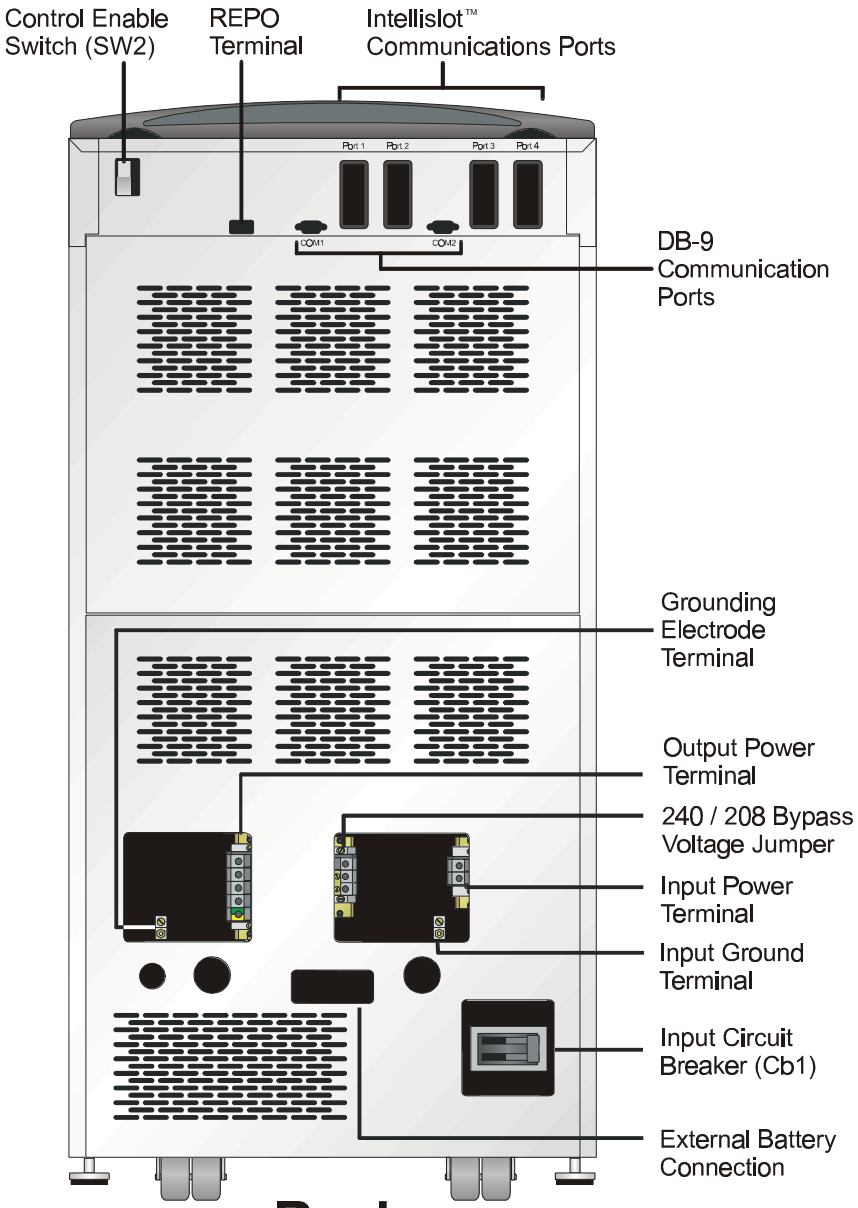
- Power Modules – for power conditioning
- Battery Modules – for back-up power
- System Control Modules – for system monitoring and communications
- LCD display for comprehensive user indications and programmable controls
- Output transformer for isolation

COMMUNICATIONS

- Dry contacts
- RS-232
- Optional communications via Intellislot™ communication ports



Front
with bezels removed



Back
with access plates removed

Modes of Operation

The *Nfinity* UPS is designed to operate as a true on-line system in the following modes:

Normal Mode

The Power Module rectifiers derive power from a utility AC source and supplies regulated DC power to the inverter. The module's inverter regenerates precise AC power to supply the connected equipment. The battery charger maintains a float-charge on the battery.

Back-Up Mode

When AC utility fails, the connected equipment is supplied power by the inverter, which obtains energy from the battery modules. The output power equipment will not be interrupted during the failure or restoration of the AC utility source.

Auto Restart Mode

After a power outage and complete battery discharge, once the AC utility is restored, the UPS will automatically restart and resume supplying power to the connected equipment. This feature is enabled at the factory, but can be disabled by the user. The user can also program two auto restart delay settings:

1. Battery capacity level (%)
2. Countdown timer

Recharge Mode

When AC utility is restored, the unit will then automatically recharge the battery modules until they are fully charged.

Bypass Mode

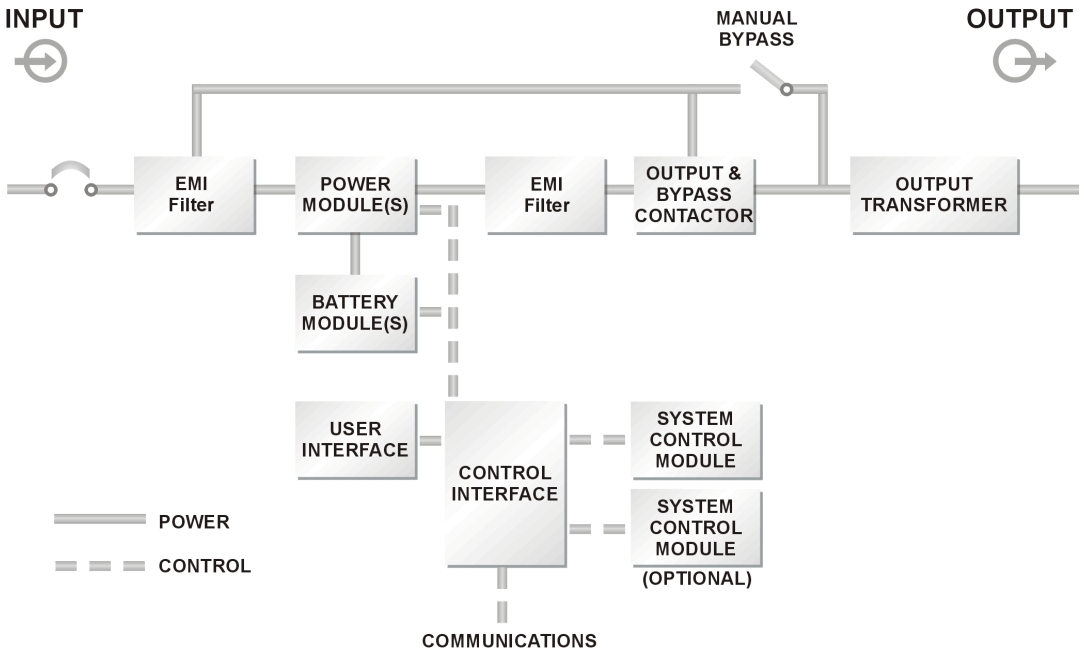
The bypass provides an alternate path for power to the connected equipment that operates in the following manner:

Automatic

In the event of an internal failure or should the inverter overload capacity be exceeded, the UPS performs an automatic transfer of the connected equipment from the inverter to the bypass source.

Manual

Should the UPS need to be taken out of service for limited maintenance or repair, manual activation of the bypass will cause an immediate transfer of the equipment from the inverter to the bypass source.



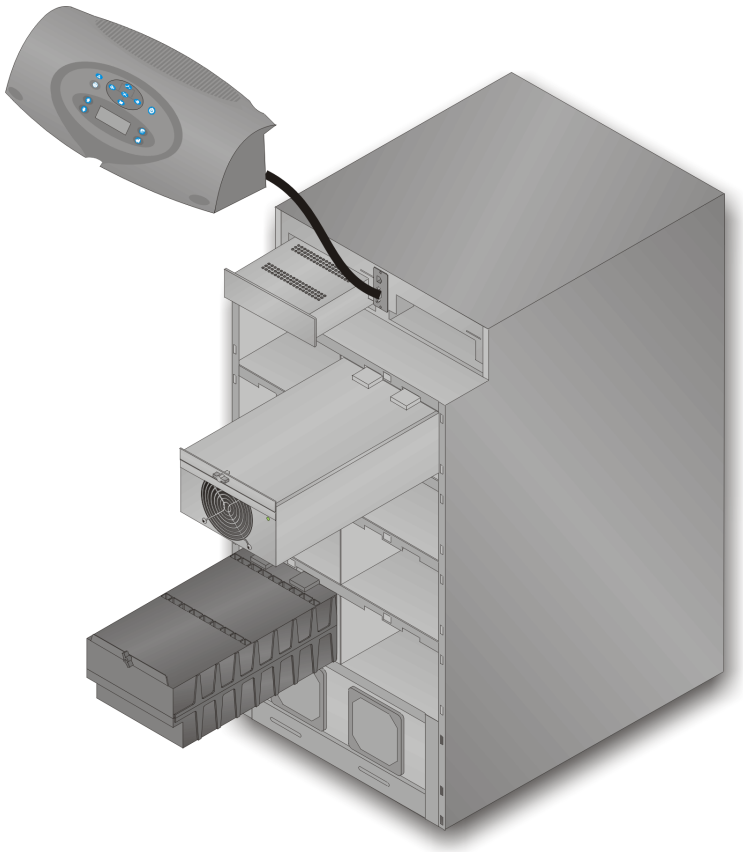
Major Components

The following is a general description of each component and its functions. Please review this section carefully, as it will give you a better understanding as to how *Nfinity* operates.

Unit Frame

Nfinity's frame houses all of the other system components. Looking at the front of *Nfinity*™, one will see a series of plastic bezels. By grabbing these bezels from the side and pulling out, you will remove the bezel to reveal the Battery / Power Module bays. The bottom bezel covers the cooling fans and the Manual Bypass Switch.

The User Interface Module is located above the Power / Battery Module bays for easy access. From here the user may find out various information about *Nfinity*'s condition. By moving the User Interface and setting it on top of the frame, you will see the System Control Module bays.



Nfinity's frame with bezels removed

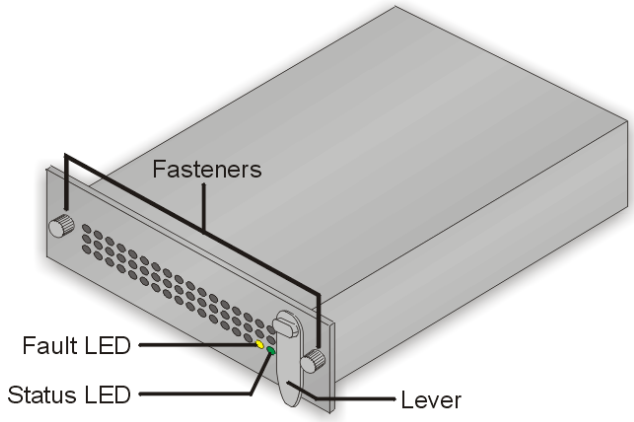
User Interface Module

The User Interface Module is the primary source of communication between the UPS and the user. From the interface, the user can:

- View the status of the UPS
- Custom configure the system
- Review the event log to assist with troubleshooting
- Enable / disable the output power
- Silence the audible alarm

For a more detailed explanation on how to operate the User Interface module, see the Controls and Indicators section of this manual.

User Interface Module



System Control Module

System Control Module

The System Control Module is the communicative backbone of the UPS. It gathers input from all modules and processes the data to control the operation of the system – including monitoring the condition of each module. An optional second System Control Module can be installed to provide full system functionality (operation and communication), in the unlikely event a Control Module should fail.

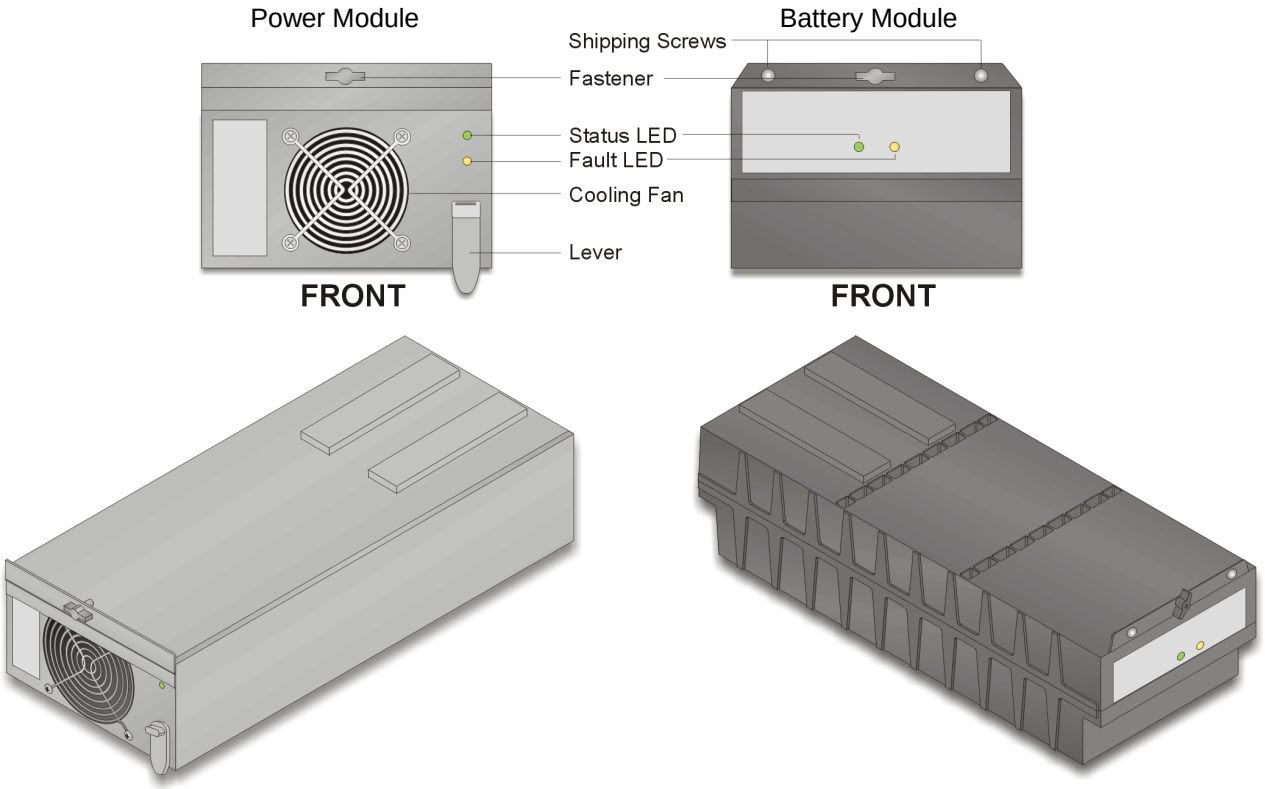
Under normal operation, the Status LED (green) will blink and the Fault LED (amber) will be off. For any condition other than this, check the Troubleshooting section of this manual.

Power Module

The Power Module maintains the condition of power in the *Nfinity* UPS. Each module is an independent 4-kVA unit, consisting of a power factor corrected rectifier, battery charger, and inverter, with associated monitoring and control-circuitry. The modules are paralleled to provide greater capacity and/or redundancy. Modules may be added or replaced on-line with no interruption or danger to the connected equipment.

Battery Module

The Battery Modules provide back-up power in the event of input utility failure. Each module contains a quantity of ten individual 12-volt valve regulated (VRLA) battery blocks with associated monitoring and controls to isolate the battery module in the event of a battery failure. The modules are paralleled to provide greater back-up time and/or redundancy. Modules may be added or replaced on-line with no interruption or danger to the connected equipment.



Under Normal Operation, the Status LED (green) will blink and the Fault LED (amber) will be off. For any condition other than this, check the Troubleshooting section of this manual.

Installation

Preparation
Unloading
Cable Installation
Communications

Preparation

These installation instructions provide all the information needed for positioning the UPS (including environmental requirements) and for connecting the input and output power cables.

Inspection

Upon receiving the UPS, examine the packaging for any signs of mishandling or damage. If any damage is noted, call your local Liebert representative and/or notify your carrier.

Environment

Note: Operating in temperatures above 77° F (25° C) will reduce battery life. The UPS environment must be free of conductive contaminants and excessive moisture (water condensation, flammable vapors, chemical fumes, or corrosive gasses and liquids).

Required Setup Equipment

The tools below are required in order to properly setup your UPS:

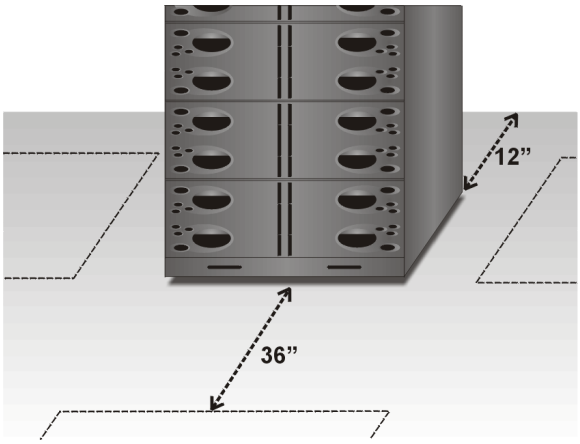
- Pallet jack
- 1/2" (13mm) ratchet or wrench
- Torque Wrench (in / lb)
- Flathead Screwdriver
- #2 Phillips Screwdriver

Site Preparation

When deciding where to locate your UPS, consider the weight and size of the unit. Make sure that the structural integrity of the floor can withstand the weight of a fully loaded unit. Refer to the table below for size and fully populated weight considerations:

Model	Max Weight	H x W x D
8 bay	871	40" x 20" x 28"
12 bay	1186	53" x 20" x 28"

Check to make sure that your UPS will be located in a well-ventilated area with at least 12 inches behind it. The UPS is force cooled with the aid of internal cooling fans. Cooling air enters from the front of the UPS and is exhausted through ventilation grills in the back. It should also have at least 36 inches in front, in order to change modules when necessary.



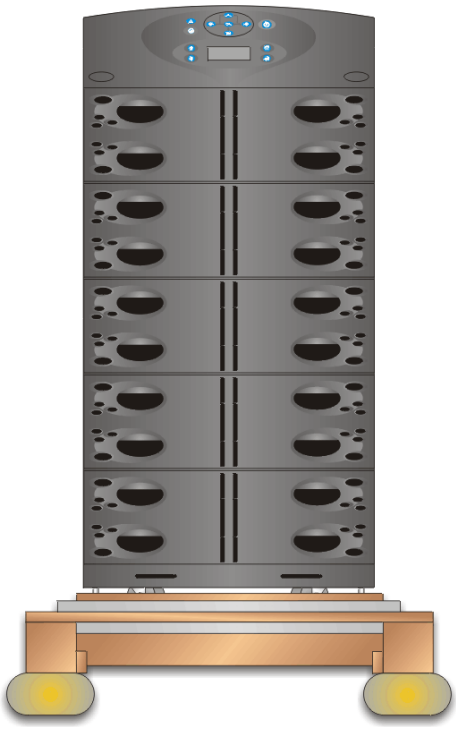
The unit frame is bolted to the shipping pallet to ensure safety. It is recommended that a pallet jack be used to transport the unit to its operating location (prior to unbolting the unit).

Unloading

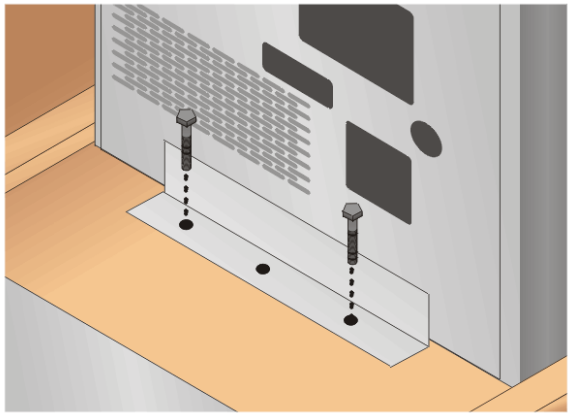
Unloading the UPS

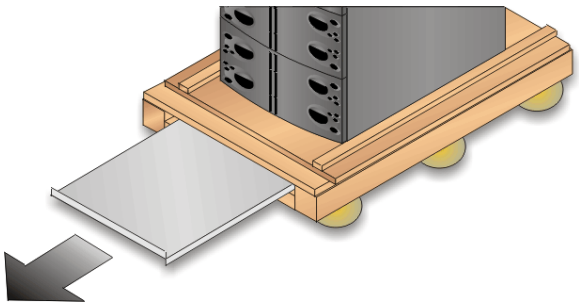
CAUTION: This UPS is very heavy (see weight on previous page). At least two people should be present to unload it off of the pallet.

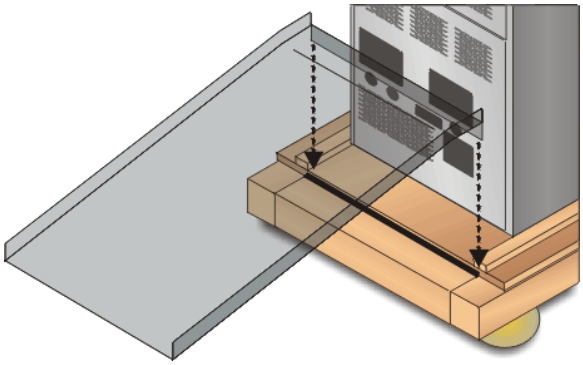
1. Once the UPS is near the desired operating location, remove the cardboard cover.



2. Use a ratchet (1/2” or 13mm) or open-ended wrench to remove the four mounting bolts from the pallet brackets. Remove mounting brackets from the pallet and UPS. Keep brackets for future transportation of UPS, or for additional stability once in place.

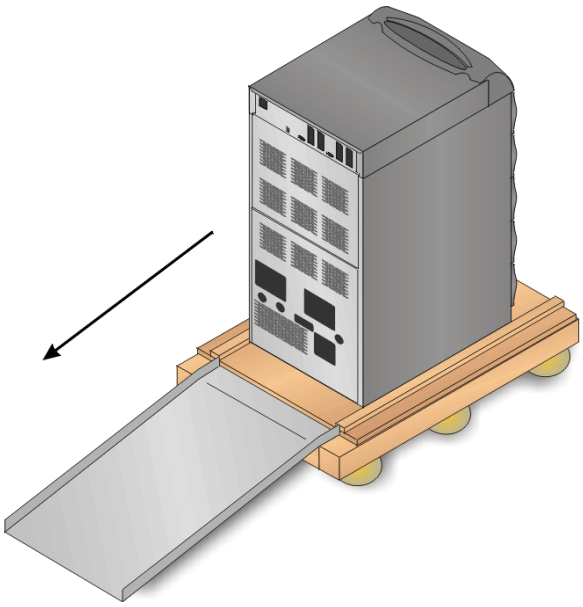




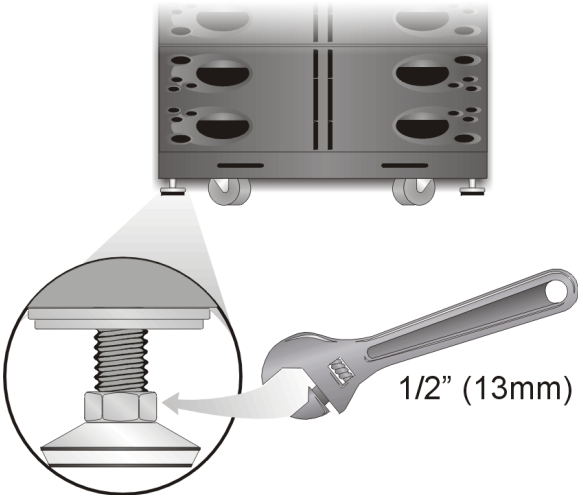


3. Remove the metal ramp from the bottom of the UPS, rotating it. Fit ramp in pallet slot as shown above.

4. Using two people, slowly move the UPS down the ramp until the UPS is on level ground.

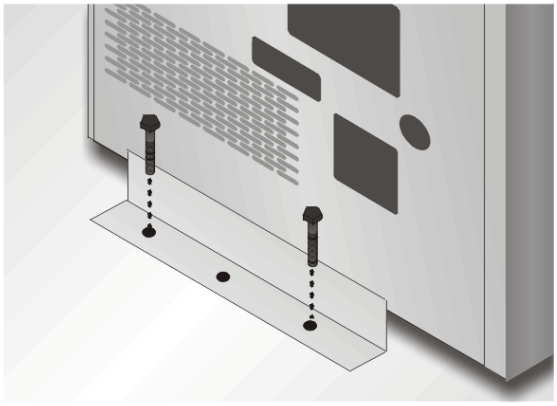


5. Once the UPS in its desired location, adjust the leveling feet to secure its position.



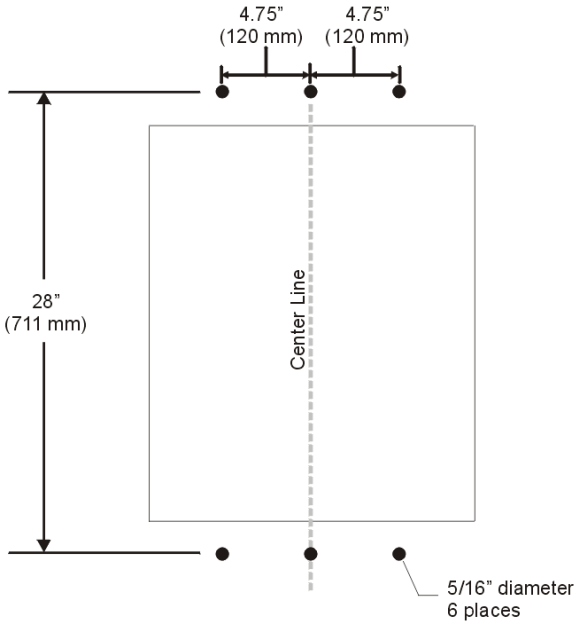
Stationary Mounting

Additional stability can be added by bolting the mounting brackets (used in shipping) to the floor.



For greater stability, use a higher-grade bolt. Refer to the dimensions below when drilling holes for stationary mounting.

Optional Stationary Mounting



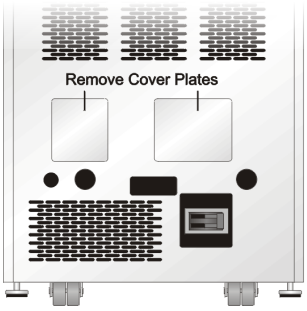
Cable Installation

Wiring Preparation

WARNING: Please read this section thoroughly before attempting to install wiring to this unit.
Be sure that the unit is not connected to any AC utility power source before installing any wiring to this unit. This UPS should be installed by a qualified / certified electrician.

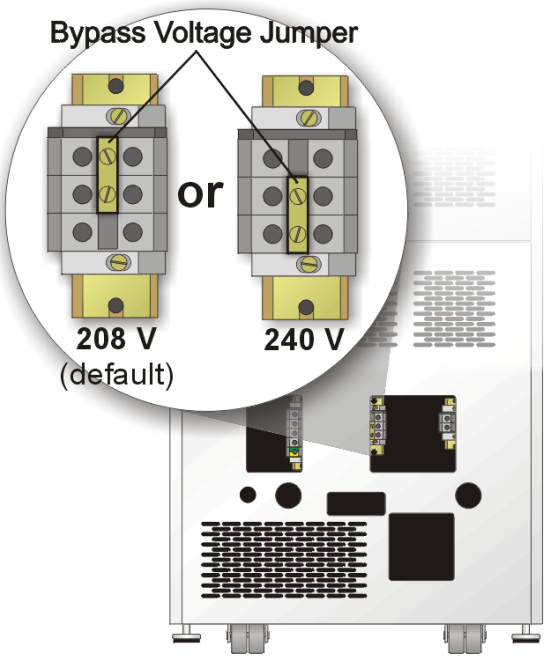
Removing the Cover Plates

On the back of the UPS, cover plates are over the input and output terminals, as shown on right. Remove these using a Phillips screwdriver. Keep screws and plates to one side.



Configuring the Bypass Voltage (TB2)

The UPS voltage is factory set to 208V. Should the user have a utility supply of 240V, the bypass voltage jumper will have to be changed to ensure correct output voltage.



Power Cable Installation

Refer to the charts below when selecting cables:

Power Cable and Protection Ratings			
	120V	208V	240V
Max Input Current		79 A	69 A
Input Protection		100 A	90 A
Max Output Current	67A / phase	77 A	67 A
Input / Output Terminal Details	2 AWG max (35 mm²) 6 AWG min (16 mm²) Torque Rating: 22-26 in/lb (2.5-3 nm)		

90°C rated copper wire is recommended

Notes:
If the start-up is on bypass the UPS has a 3-cycle inrush current that is 6 times the rated output current. This must be taken into account when selecting the overload protection device at the AC input supply distribution point. To avoid random tripping on start up, it is recommended that the AC input supply be protected with a circuit breaker capable of withstanding this initial inrush.

This UPS is fitted with EMI suppression filters. Earth leakage current is less than 40mA. Transient and steady state earth leakage currents may occur when starting the equipment. This should be taken into account when selecting ground current detection devices, as the earth leakage currents of both the UPS and load will be carried.

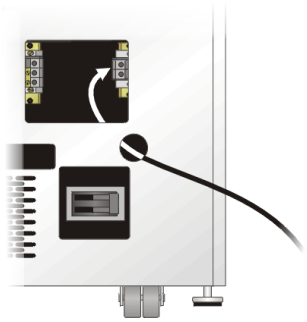
Input and output cables must be run in separate conduits.

A branch rated overcurrent protection device (circuit breaker or fused disconnect switch) must be installed for the AC output.

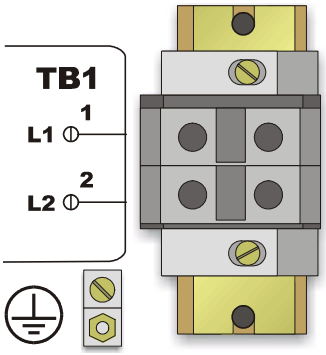
Input Wiring (TB1)

To connect the input wiring, follow these steps:

1. Locate the input wiring access, remove the knockout and pull the three input wires through it, allowing some slack for installation.



2. Secure the conduit to the rear panel of the UPS.
3. Input Power cables connect to screw terminals on the Input Terminal Block located to the right of the Bypass Voltage Terminal. Connect the wires to the block connections as shown below. Using a torque wrench, turn the screws clockwise until tightened to the proper torque value. Insert the ground wire through the grounding lug and tighten it to the proper torque value.



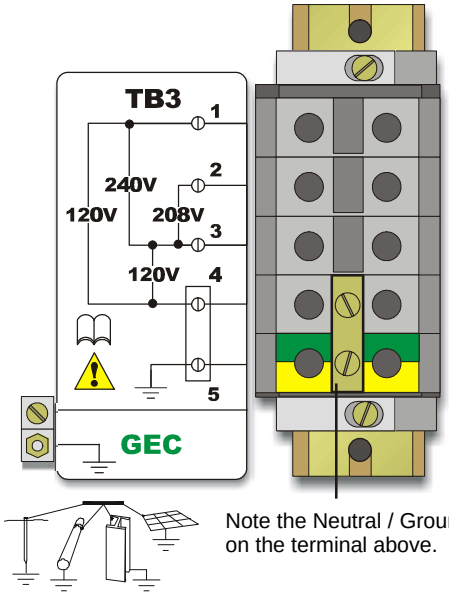
Grounding Conductor Installation

An insulated grounding conductor must be identical in size, insulation material, and thickness as the grounded and ungrounded branch-circuit supply conductors. This cable must be green with or without one or more yellow stripes, and is to be installed as part of the branch circuit that supplies the unit or system.

The grounding conductor is to be grounded to earth at the service equipment or, if supplied by a separately derived system, at the supply transformer or motor-generator set.

Output Wiring (TB3)

Output wiring may be configured one of two different ways (240 / 120 or 208 / 120). Refer to the chart and diagram below when configuring the output wiring.



Note the Neutral / Ground jumper on the terminal above.

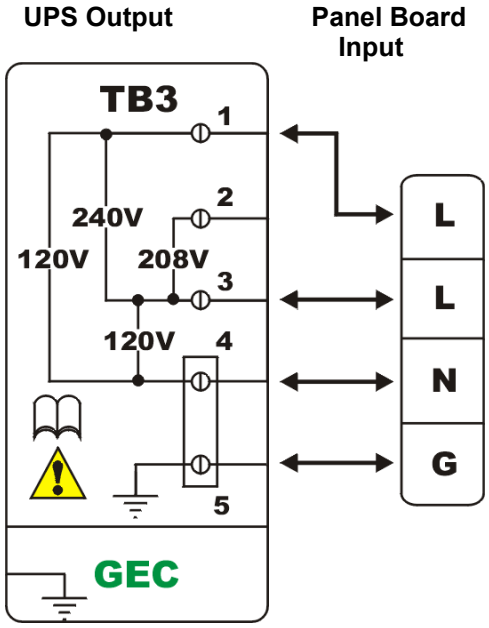
Voltage	120	208	240
Terminals	1, 4 3, 4	2, 3	1, 3

Only use the connections listed above. Other connections will produce non-standard voltages.

The *Nfinity* UPS contains an isolation transformer that generates a neutral conductor for the connected equipment. The UPS is a separately derived source and contains a neutral to ground bonding jumper. A grounding electrode conductor (GEC) must be installed in accordance with national and local wiring code / regulations.

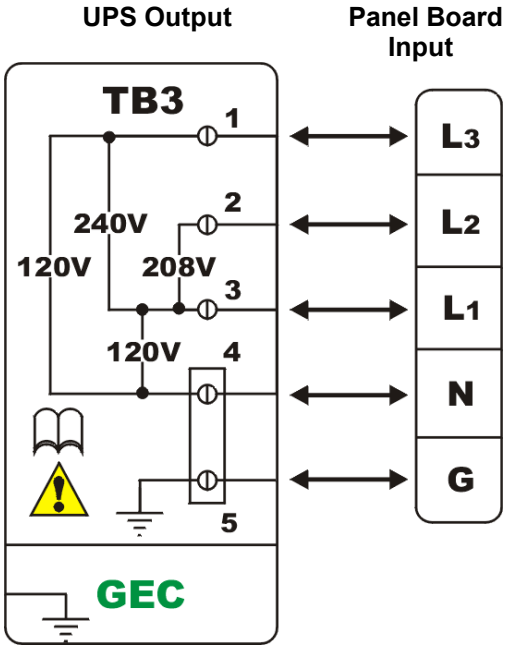
Connecting to External Panel Boards

If connected equipment will operate at 240 / 120 VAC, use a standard single-phase panel board.



If connected equipment will ONLY operate at 208 / 120 VAC, use a three-phase panel board.

Ensure that all 120V equipment is connected L_1 – N, L_3 – N. Ensure that all 208V equipment is connected L_1 – L_2.



REPO Switch

Nfinity is equipped with a Remote Emergency Power Off (REPO) Switch.

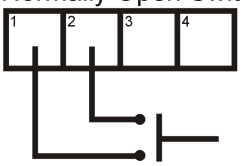
The user must supply a means of interfacing with the REPO circuit to allow disconnecting the UPS input feeder breaker to remove all sources of power to the UPS and connected equipment to comply with national and local wiring codes / regulations.

REPO Switch

Connection Diagram

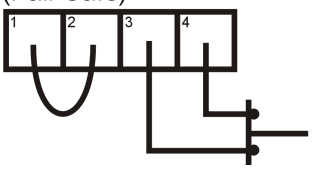
As Shipped

Normally Open Switch System



Remove jumper before wiring.

Normally Closed Switch System (Fail-Safe)



1 = 24V DC, 35 mA
2 = sense
3 = sense
4 = ground

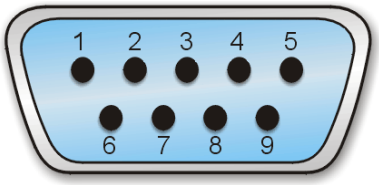
If the installation does not require connection to a REPO system, the jumper must be removed.

Caution: To maintain safety (SELV) barriers and electromagnetic compatibility signal cables should be segregated and run separately from power cables.

Communication

COM Ports

Nfinity is able to communicate through multiple communication ports simultaneously.



Pin Assignment

COM 1 – Relay Contacts

Relay contacts are available through a DB-9F communications connector. Contact closure provides the following:

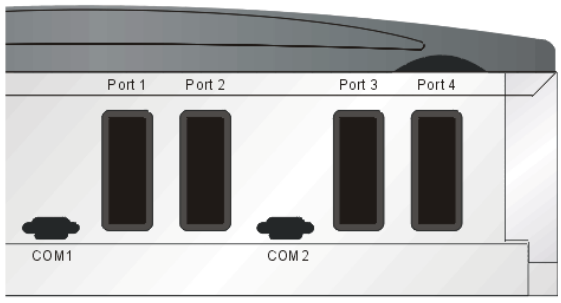
Pin	Assignment
1	Low Battery (normally open)
4	UPS shutdown in battery mode (5-12 V DC for 1.5 sec)
5	Common
7	Low Battery (common)
8	On Battery (common)
9	On Battery (normally open)

The contacts are rated 48V DC, 1 Amp maximum and are compatible with the SiteNet MultiLink software.

COM 2 – Serial

Nfinity is able to communicate via Liebert proprietary protocol. The pin-out configuration of the DB-9 connector is:

Pin	Assignment
2	Transmit Data
3	Receive Data
5	Common



Intellislot™ Ports

The following communication cards may be used with *Nfinity*:

Intellislot™ SNMP cards – allows the *Nfinity* communicate intelligently with your Ethernet network. The SNMP card must be installed in port 1; any additional cards can be added in consecutive ports.

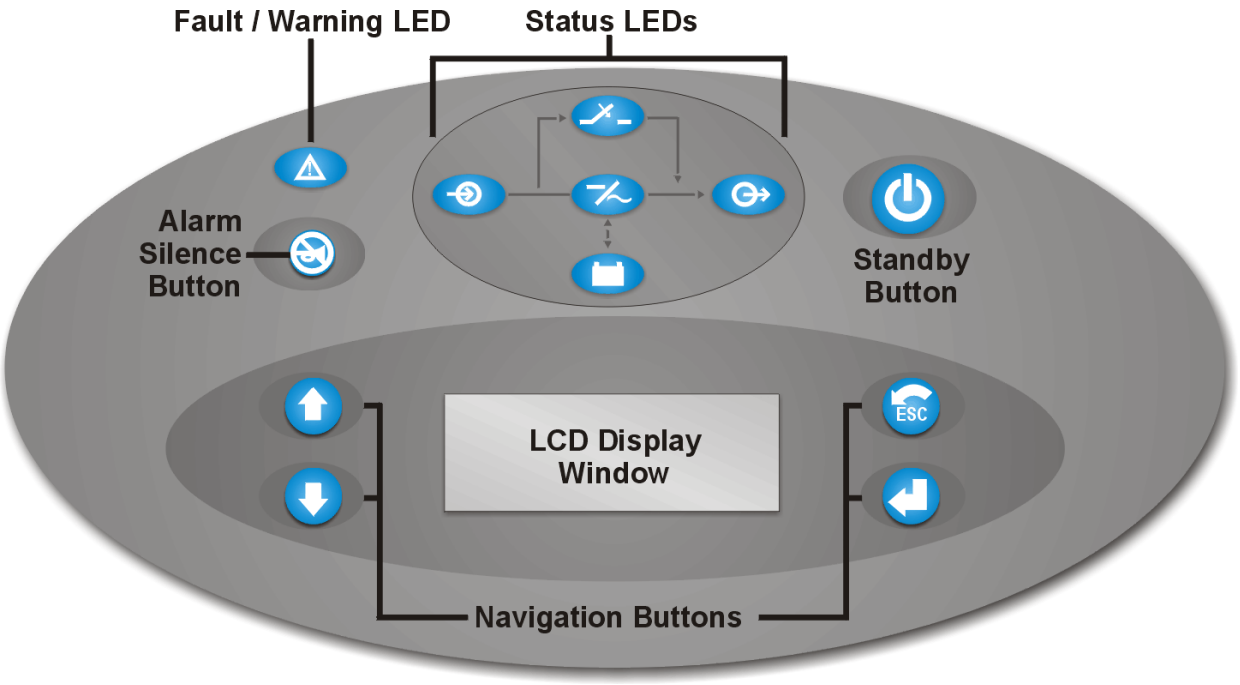
Intellislot™ MultiPort4 cards– allows up to four client computer systems to simultaneously monitor the status of *Nfinity*.

Intellislot™ Relay Contacts cards – provides contact closures for remote monitoring of alarm conditions; On Battery, On Bypass, Low Battery, Summary Alarm, UPS Fault and On UPS signals. It will integrate with AS400 computers (additional cable required) and other monitoring systems.

Operating Instructions

Controls and Indicators
Operating Procedures
Main Menu

Controls and Indicators



Display Controls

The Front Display Panel informs the user of the status of the UPS, and lets him configure the UPS to his own needs or preferences through the user interface.

It consists of a series of Status LED's, a 4 line by 20 character LCD display window, and buttons for navigation (as displayed above).

Buttons

Refer to the legend below in order to properly navigate the *Nfinity* User Interface.

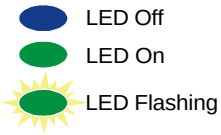
- **Up** / **Down** - Navigates cursor on display menus
- **Escape** - Returns to previous display screen
- **Enter** - Selects displayed information
- **Standby** - Enables / Disables output power
- **Alarm Silence** - Mutes the audible alarm

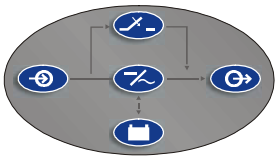
LEDs

Refer to the legend below to indicate occurrence when an LED is lit.

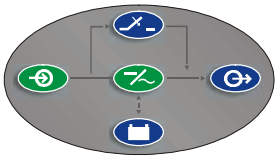
- **Fault / Warning**
  Solid- A UPS fault condition has occured.
  Flashing- A Warning has occured. Consult event log.
- **AC Input** - AC utility is available
- **On Bypass** - The Bypass is supplying the power
- **Inverter On** - The Inverter is supplying the power
- **On Battery** - Battery is supplying power to the inverter
- **AC Output** - Power is available to supply the load

Status LED Modes

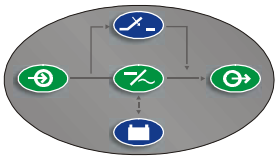




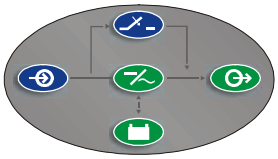
UPS is Off or Initializing



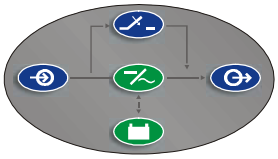
UPS On, Utility Good and Output Off



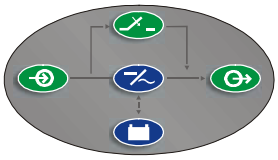
UPS On, Utility Good and Output On
(Normal Operation)



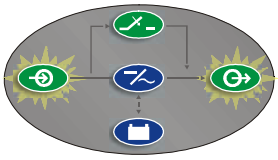
UPS On, Utility Bad and Output On
(On Battery Operation)



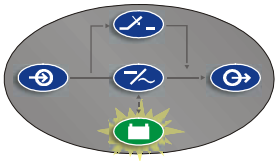
UPS On, Utility Bad, and Output Off



Unit in Bypass Operation
(Manual or Automatic)



Unit in Manual Bypass Operation with
Utility out of Bypass Operation Range

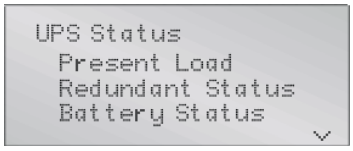


Shutdown Due to end of Discharge

Navigating the Menu

In order to review or change any settings on the UPS, it must be navigated using the buttons seen on the previous page. Because some menus contain more than four rows of information, you may see an arrow on the display pointing up or down (as shown below) – indicating to scroll using the ⬆ or ⬇ buttons.

If you are scrolling through any of the main menus, items will scroll one line at a time with the menu heading on the top line:



Pressing ⬇ reveals:

Note the arrows on the screen indicating that the user scroll up or down to reveal more information.

Operating Procedures

Start-up and Initialization

Follow these steps in order to start up the UPS.

1. Close Input Circuit Breaker (CB1) and close the Enable Switch (SW2). Ensure the manual bypass switch is in UPS position. You should see the following on the LCD display window:

2. Press ⏻ button.

3. Press ↵ to access the main menu.

Shutting down the UPS

Use the following procedure to power down the UPS.

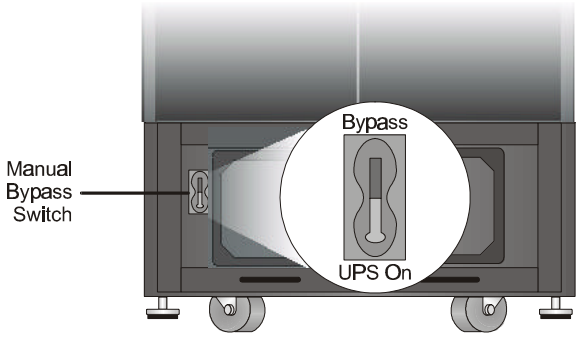
1. Press ⏻ to disable power from the connected equipment.

2. Verify request to disable the output by pressing ↵.

3. Turn off the Enable Switch (SW2). Open the Input Circuit Breaker (CB1).

Manual Transfer to Bypass

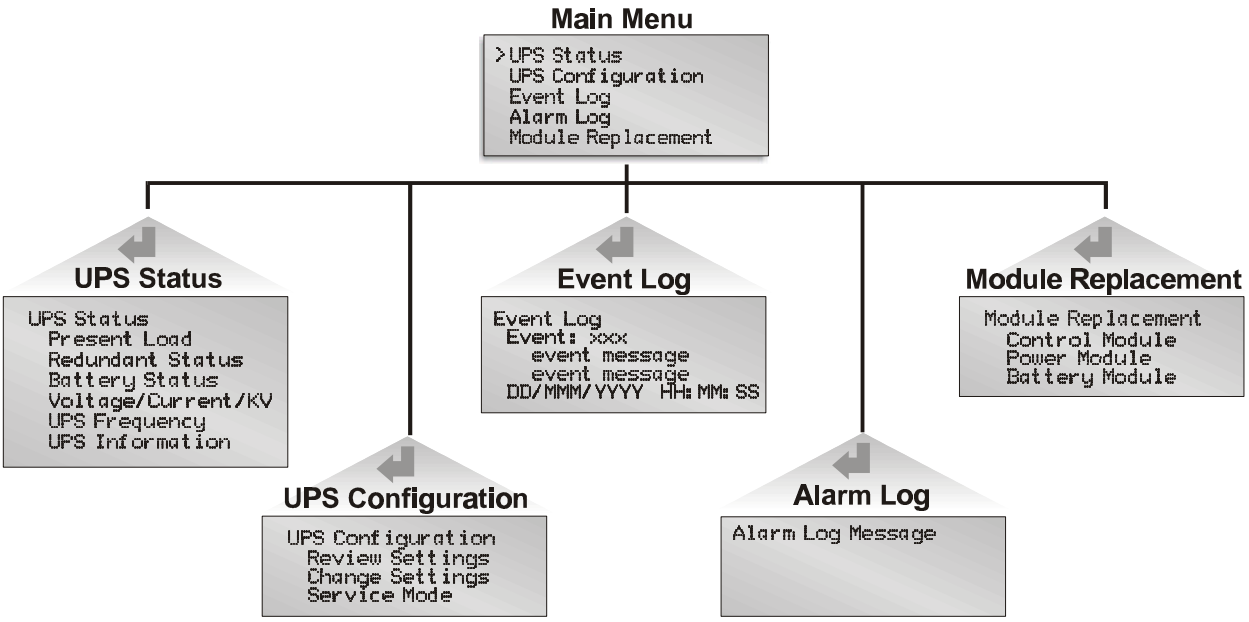
In the event of a UPS overload or failure, the UPS will transfer to bypass via its automatic bypass switch. It is possible for the user to manually transfer the UPS to bypass by operating the manual bypass switch located behind the lowest front cover to the bypass position. To transfer the UPS from bypass to normal mode, simply operate the manual bypass switch back to the UPS position.



It should be noted that the load is not protected from utility interruptions when in bypass mode.

Main Menu

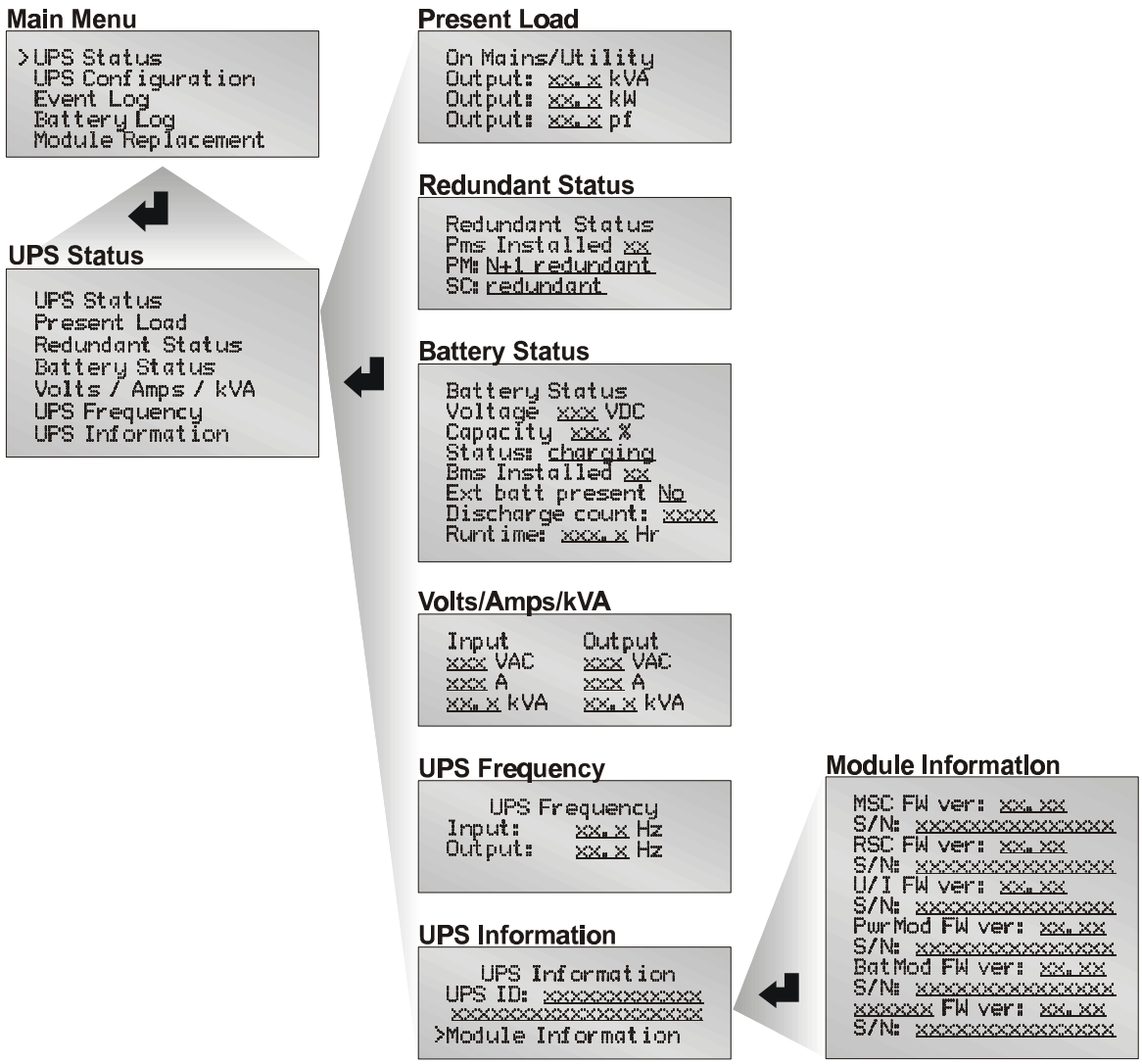
After initialization, the ↵ button will take you to the main menu. From here you may check on the status of the UPS, review the event and alarm log, configure your UPS, and even receive instructions on replacing modules. The main menu is divided into five sub-menus as shown below:



Use the ↑ ↓ buttons to select the desired menu item and press ↵ to access the appropriate sub-menu.

UPS Status Screen

From the main menu the user may select UPS Status and press ↵. Once at the UPS Status Screen, the user may access any information on the present condition of the UPS. Note the chart below when reviewing the UPS. Any underlined text indicates measured parameters.



UPS Configuration Screen

Review Settings

Follow this procedure to review your UPS configuration settings. Any underlined text indicates factory default values.

Follow the menus below by pressing ⬇ or ⬆ to review the settings:

Main Menu

```
  UPS Status
>UPS Configuration
  Event Log
  Module Replacement
```

UPS Configuration

```
UPS Configuration
> Review Settings
  Change Settings
  Service Mode
```

Review Settings

```
Voltage
Battery
Alarm
Service Contact
```

Voltage Settings

```
Voltage Settings
Input  208/120 LLG
```

Battery Settings

```
Battery Settings
Test intervl 2 weeks
on Wed at 06:00
Low Batt Warn: 2 min
```

Alarm Settings

```
Alarm Settings

Power: N+1
Max Load: xx.x kVA
```

Service Contact

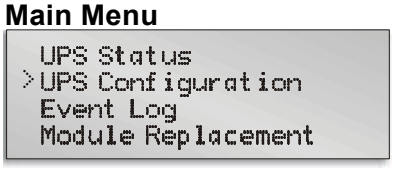
```
Service Contact
Liebert Corp.

1-800-543-2378
```

Change Configuration Settings

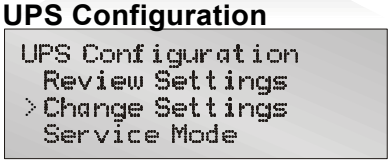
Change Settings Menu

Starting from the Main Menu, locate and press UPS Configuration. From the UPS Configuration screen, select the Change Settings option. Here one may configure *Nfinity* from a large variety of selections. Items indicated by an asterisk (*) or underlined are the selected settings.

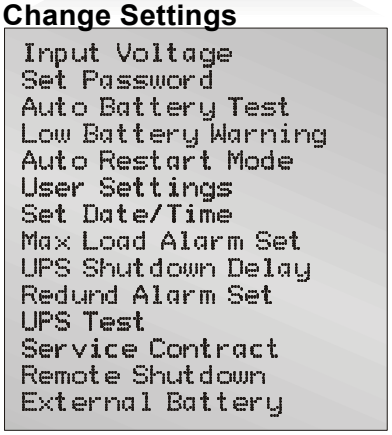
Main Menu



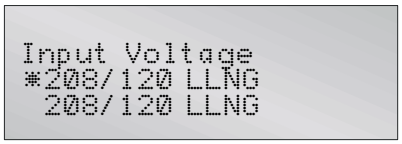
UPS Configuration



Change Settings

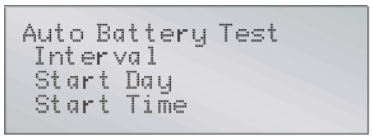


Input Voltage: Select the required input voltage setting. This voltage must match the bypass voltage jumper setting.

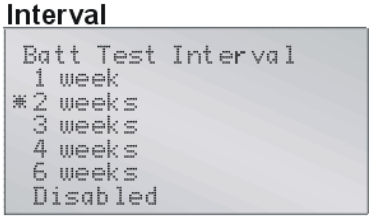


Set Password: Set a Password to prevent unauthorized users from changing the configuration of the *Nfinity*. It can be up to 7 characters in length. Once set, the password will be required to change the configuration.

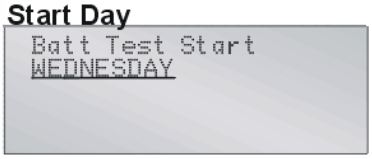
Auto Battery Test: Configure when and how often the *Nfinity*'s automatic battery test will run. This test is designed to ensure Battery system integrity and warn of early problems.



Interval

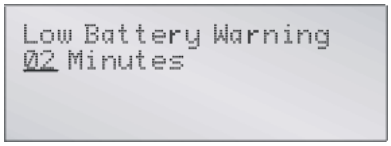


Start Day

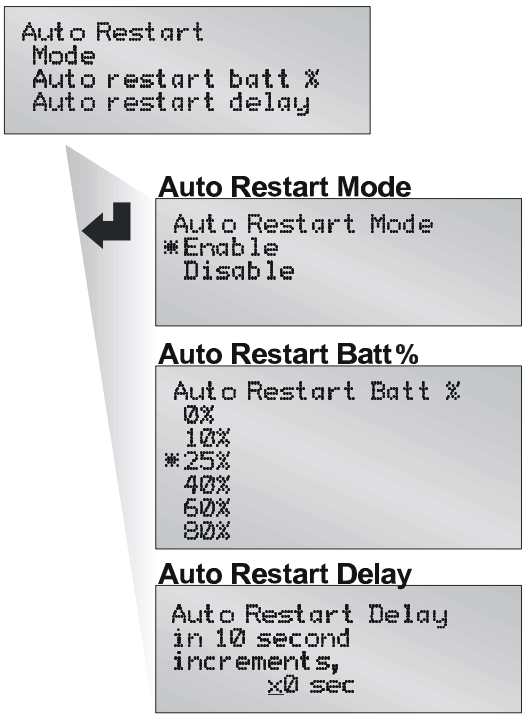


Start Time

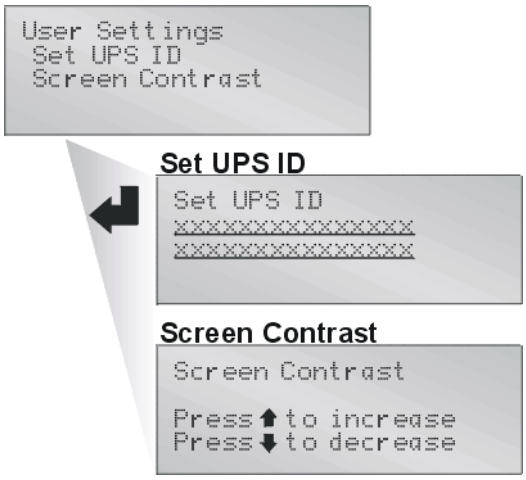
Low Battery Warning: Notifies user as to how much runtime is available. Can be set from 1 to 30 minutes.



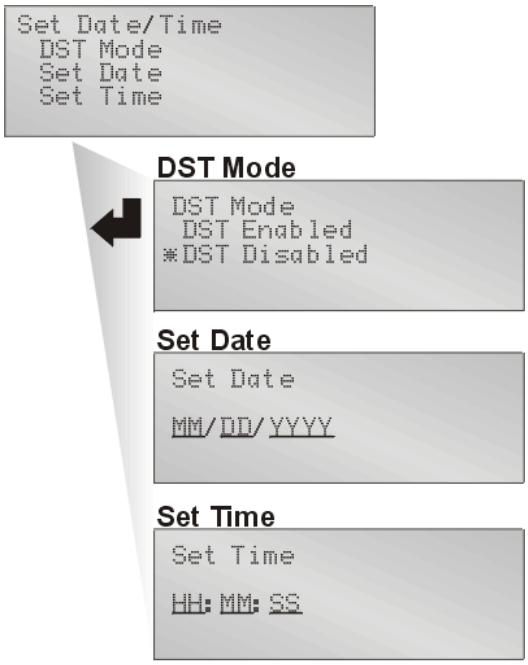
Auto Restart: Automatically restarts once both delay parameters (battery capacity percentage and countdown timer) are met.



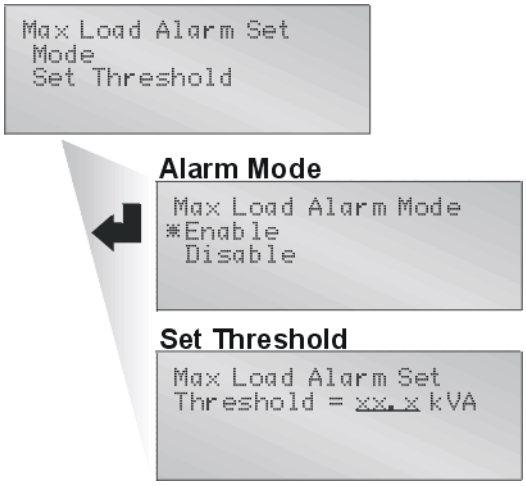
User Settings: From here one can enter the UPS ID or adjust the contrast of the user interface LCD.



Set Date/Time: Allows user to enable DST (Daylight Savings Time), change the Day, Date and Time setting on *Nfinity*. When enabled, the time will automatically adjust to Daylight Savings.



Max Load Alarm Set: Allows an alarm to set when *Nfinity*'s load reaches a specific level.



UPS Shutdown Delay: Delays UPS shutdown for specified amount of time after receiving shutdown command via communications (serial or SNMP).

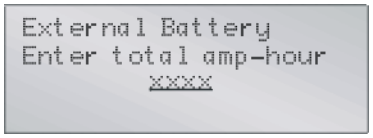
Redundant Alarm Set: Sets Alarm to notify user when redundancy is no longer available.

UPS Test: Allows user to test the Batteries, LED's, LCD, or Alarm.

Service Contact: Set a contact for the user to reach if problems occur.

Remote Shutdown: Enables / Disables the Remote Communications Shutdown.
If you are using SiteNet™ software, this parameter should be enabled in order for the UPS output to be turned off once the operating system has been shutdown.

External Battery: Sets total amp-hour for external batteries to provide a more accurate runtime remaining value on the LCD display and through communications.

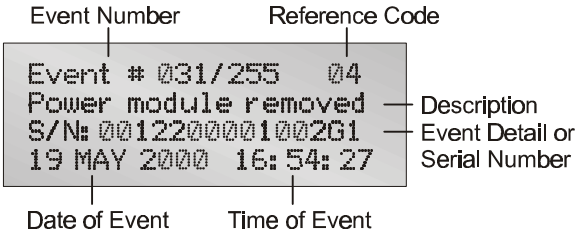


Enter in the following when using the External Battery Cabinets with Chargers.
(P/N: PB10SLF105WC120)

# Cabinets	AH Value
1	0105
2	0210
3	0315
4	0420
5	0525
6	0630

Event Log

One may open the Event Log from the main menu. By accessing the Event Log, the user may scroll through the *Nfinity*'s past 255 occurrences in chronological order by pressing the ⬆ ⬇ buttons.



The typical event log screen will display the event number and reference code on the first line. The purpose of this code is to assist factory trained service personnel in troubleshooting. Please make a note of the code number when contacting technical support. The second line contains the event description. The third line will have either more detail about the event, a serial number indicating as to which module the event occurred, or be left blank. The last line will show the date and time the event occurred.

Press ESC to go back to the main menu.

In the event of an event / alarm, the User Interface LCD will display the last message regardless of the default screen. A list of possible event / alarm messages is displayed at right. If you encounter one of these or other messages and are unsure of the corrective action to take, please contact a qualified Liebert representative at the number listed in the back of this manual.

For more information regarding events, consult the troubleshooting section.

Alarm Log

When an alarm sounds, the User Interface LCD will display a general explanation as to what the alarm is indicating. These alarms will also be displayed in the Alarm Log, which will display the last 32 alarm messages. To view these messages in chronological order, press the ⬆ ⬇ buttons.

The first line of a typical alarm log screen will display the reason for the alarm occurrence. The second line will give a more specific detail of the occurrence (i.e.; module serial number).

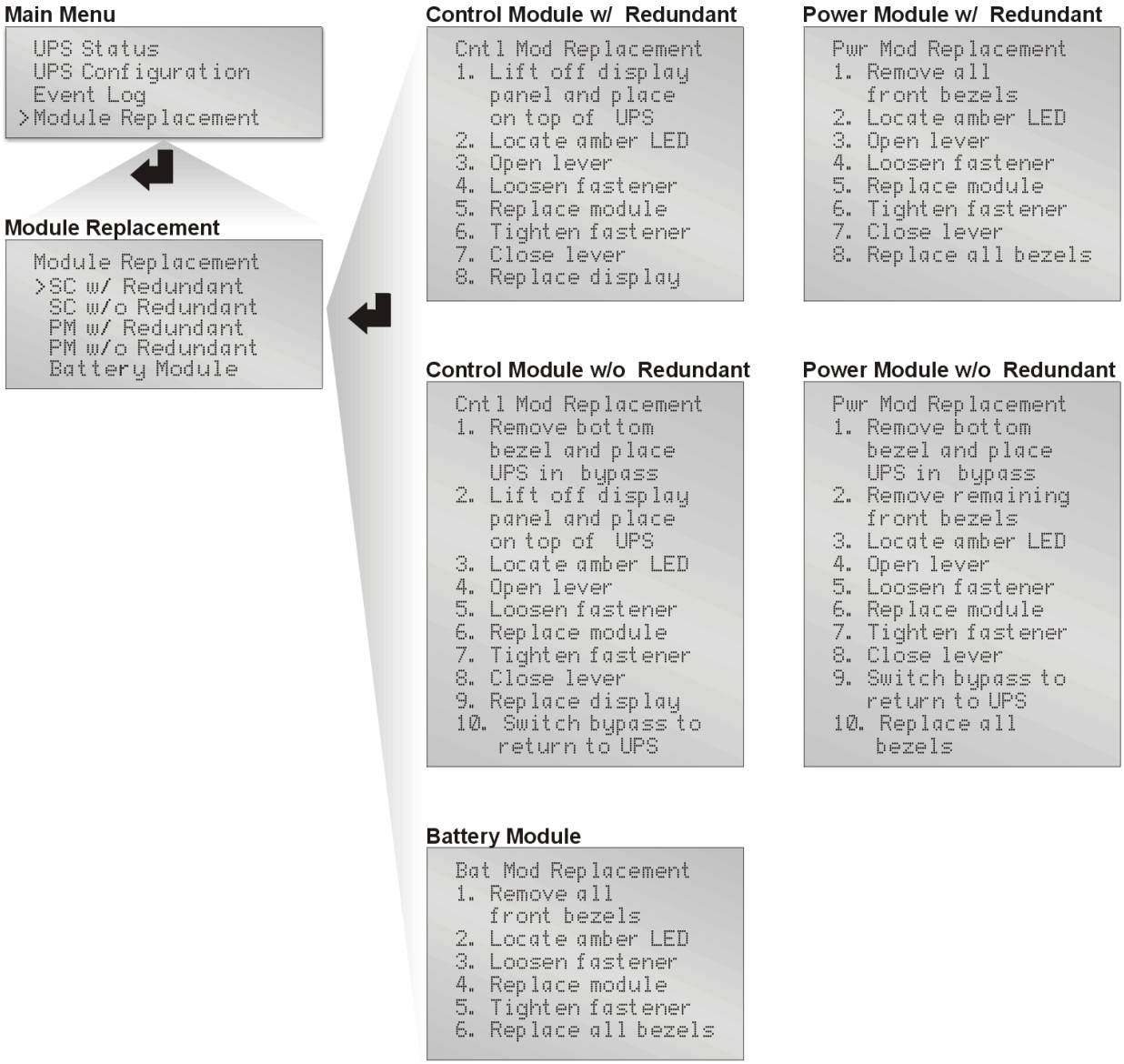
Press ESC to go back to the main menu.

Below is a list of possible events / alarms.

Occurrence	Event	Alarm
Battery EOD	✓	
Battery Mod Removed	✓	
Battery Module Added	✓	
Battery Module Fail	✓	✓
Battery Test Fail	✓	✓
Battery Test Pass	✓	
Display Panel Added	✓	
Display Panel Removed	✓	
Firmware Error	✓	✓
General UPS Fail	✓	✓
Main Control Fail with redundant control	✓	✓
Max Load Alarm	✓	✓
Power Mod Added	✓	
Power Mod Failure	✓	✓
Power Mod Removed	✓	
Red. Power Alarm	✓	✓
Transformer Fan Fail	✓	✓
UPS Auto Restart	✓	
UPS CANBus Fail	✓	✓
UPS Low Battery	✓	✓
UPS on Battery	✓	✓
UPS on Bypass (auto)	✓	✓
UPS on Bypass (manual)	✓	✓
UPS Shutdown	✓	
UPS Shutdown Imminent		✓
Wrong Voltage	✓	✓

Module Replacement

The user interface also supplies instructions for removing and replacing modules. From the main menu, access the module replacement screen and select the type of module. Refer to the screens below for reference:



For more details on module replacement, consult the troubleshooting section of this user manual.

Troubleshooting

Alarm Messages
Module LED Indication
Module Replacement

Alarm Messages

In the event of an alarm, the User Interface LCD will display the last message regardless of the default screen. A list of possible alarm messages is displayed below. If you encounter one of these or other alarm messages and are unsure of the corrective action to take, please contact a qualified Liebert representative at the number listed in the back of this manual.

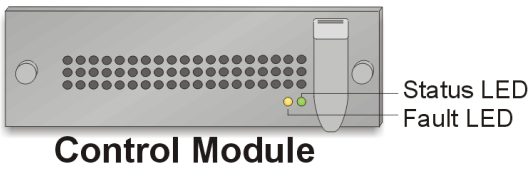
Alarm Message	Cause	Action
Battery Module Failure	Battery Module is no longer working properly.	Refer to Module LED indication section for corrective action.
Power Module Failure	A Power Module is no longer working properly.	Replace the faulty Power Module by following the procedure in this manual.
General UPS Failure	The UPS is operating on bypass.	Contact a Liebert Global Services at 1-800- 543-2378.
Battery Test Failed	Unit has detected a battery module problem.	Verify the battery status via the display and perform self-battery test.
Redundant Power Alarm	The UPS is no longer redundant.	Replace faulty module to regain redundancy.
Maximum Load Alarm	Maximum load has been exceeded.	Insert additional modules to increase load capacity or reduce current load.
System Control Module Failure	System Control Module no longer working properly.	Replace faulty module.
Firmware version error	Firmware is incompatible.	Download latest firmware version from www.liebert.com.
On Battery	Load is currently being supplied from UPS.	Wait for input AC to return.
Low Battery	Battery power is low.	Allow batteries time to recharge.
UPS on Bypass (auto)	UPS switched to auto bypass.	Alarm screen should indicate reason for auto bypass.
UPS on Bypass (manual)	User switched UPS to manual bypass.	When ready, switch back to UPS.
Transformer fan failure	The transformer cooling fans are no longer working properly.	Contact a Liebert Global Services at 1-800- 543-2378.
UPS CanBus Failure	The internal communications are not working properly.	Contact a Liebert Global Services at 1-800- 543-2378.
UPS Shutdown Imminent	The UPS is about ready to shut down	Check for faulty modules, output overloads, or Contact a Liebert Global Services at 1-800- 543-2378.
Wrong Voltage	The input voltage configuration and bypass jumper settings DO NOT MATCH.	Check to make sure the bypass voltage matches the input voltage and ensure the input voltage configuration matches the bypass jumper setting.

Module LED Indication

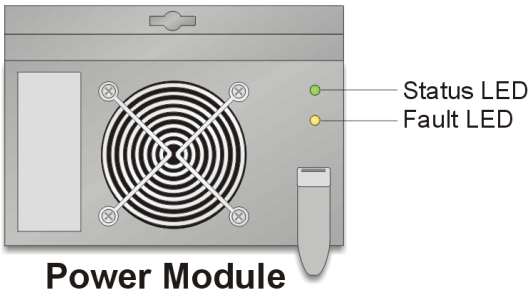
On every Battery, Power or Control Module are two LEDs to help inform the user of the module status. Refer to the chart below for Power and Battery Modules:

Status LED (Green)	Fault LED (Amber)	Module Status
OFF	OFF	Module not inserted into frame. System is OFF.
OFF	ON	Module is initializing (max 10 seconds*).
FLASHING	OFF	Normal Operation
FLASHING	FLASHING	Module is in start-up qualification mode, or module warning. **
FLASHING	ON	Module failed, is off-line and module control is functioning.
OFF	FLASHING	Abnormal operation, re-insert module. If this persists, call Liebert Global Services at 1-800- 543-2378.
ON	OFF	
ON	ON	
ON	FLASHING	

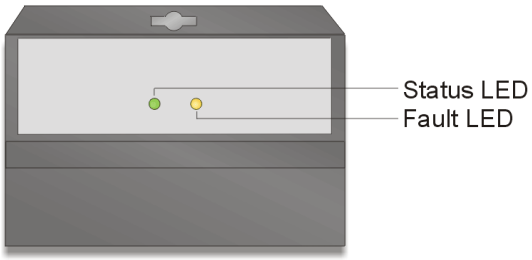
* If this persists for more than 10 seconds, check to verify the lever is in the down position or the module is faulty.
** If both Green and Amber LEDs are flashing for more than 30 seconds, then re-insert module.



Control Module



Power Module



Battery Module

Module Replacement

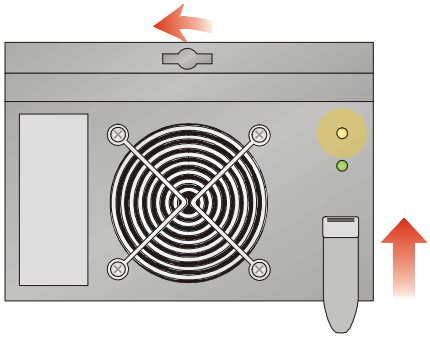
Occasionally a control, battery or power module will need to be removed or replaced. Follow the instructions below when such an event occurs. To order additional modules, contact your Liebert representative or call 1-800-LIEBERT.

Removing Modules

1. Remove bezel cover of appropriate module. When replacing a Power or Battery Module, verify the faulty module by confirming the amber LED is lit.

2. If removing a Control or Power Module with no redundant modules, switch UPS to manual bypass.

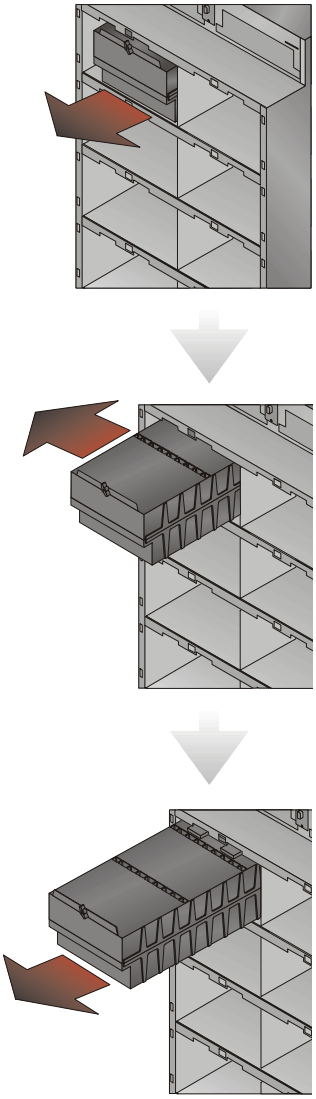
3. Pull out and lift the lever if replacing a Control or Power Module, then turn fastener counter-clockwise until it is loosened.



4. Start to pull out module. About 2/3 out it will stop. Slide module away from the center of the UPS. Continue to pull until module is removed. (Seen at right)
   Caution: Battery Modules are heavy (66 lbs, 30 kg). Make sure to use two people when removing a Battery Module.

5. Dispose of module in an environmentally responsible way that complies with local codes / regulations or return to Liebert for proper disposal.

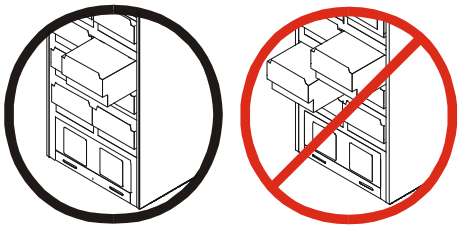
Note: Battery Modules may contain shipping screws. These screws may be removed and discarded.



WARNING

POTENTIAL TIP HAZARD

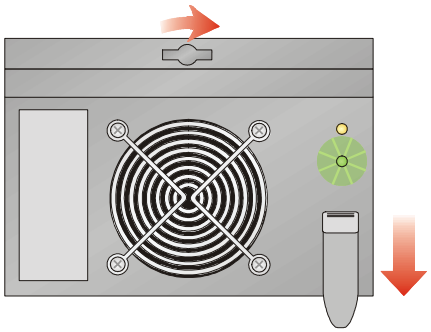
Install all modules starting from bottom to top bays. For module removal, start from top to bottom bays. Do Not remove more than one module at a time. Failure to do so may cause unit to tip over and cause serious injury.



Replacing Modules

1. Lift module to appropriate bay, resting end of module on bay shelf. Use caution not to rest the module on the lower bezel cover.

2. Push module into bay. Once half way in, slide module sideways toward the center of the UPS. Continue pushing module fully inserted.



3. Press and turn fastener clockwise until locked. If replacing a Control or Power Module, press lever down.

4. Wait about 15 seconds as the module performs a start-up test and synchronizes with the other modules. Both the amber and green LEDs should be flashing. A green flashing LED will then confirm the module is properly connected.

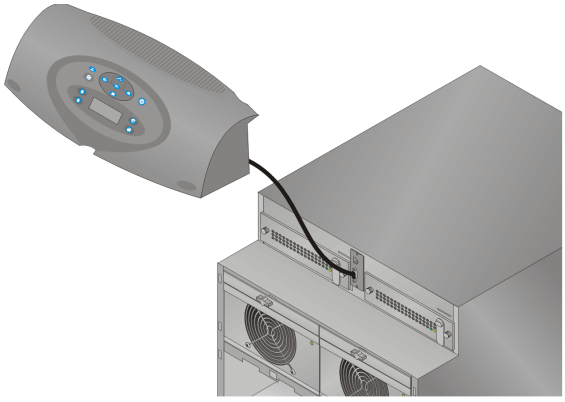
5. If UPS was placed in bypass manually, transfer back to UPS operation.

6. Replace bezels.

Replacing the User Interface

1. Lift off user interface and set it on top of the UPS frame.

2. The attached cable will be connected to an Intellislot card, found in a port between the control modules.



3. Disconnect the cable from the Intellislot card.

4. Plug the new user interface cable into the Intellislot card.

5. Set replacement User Interface into proper position.

Maintenance

Proper Care
Scheduled Maintenance
Replacing Fan Filters

Maintenance

Proper Care

Keeping your Liebert *Nfinity* UPS operating properly is imperative to optimal performance and life of the unit. It is recommended that a certified technician perform preventive and corrective maintenance. Liebert Global Services (LGS) is dedicated to ensuring the highest level of performance and unmatched support for your *Nfinity* UPS. Contact an LGS representative at 1-800-LIEBERT for services to guarantee maximum reliability and system availability.

Scheduled Maintenance

It is recommended the following maintenance is performed at least monthly:

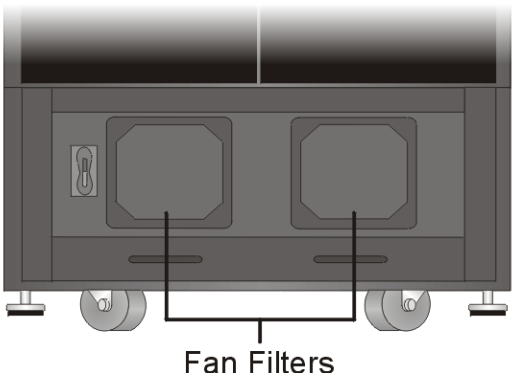
- Clean unit
- Clean / replace filters
- Verify proper airflow

It is recommended the following maintenance is performed annually:

- Verify all power modules are operating properly.
- Verify all battery modules are operating properly.
- Verify redundancy (if applicable).

Replacing Fan Filters

Nfinity's intake fans contain filters that will need to be replaced / cleaned periodically, depending on the surrounding environment. Check by removing the bottom bezel and noting the condition of the two filters. If filters are dirty, replace them by removing the plastic cover over the filter frame and inserting a new filter in its place. Use caution when replacing filters when fans are running.



The fan filters are washable and can be reused. To wash filters, place them under a running faucet (with the dirt side down) to remove dirt and dust. Blot dry with a towel and allow air-drying before reusing.

Reference

Specifications
Battery Run Times
Warranty
Technical Support

Specifications

General & Environmental	Units	4	8	12	16
Unit Rating	kVA	4	8	12	16
	kW	2.8	5.6	8.4	11.2
Conducted and Radiated EMC Levels	FCC Part 15, Class A				
Compliant Safety Standards	UL 1778; c-UL				
Compliant Immunity Standards	IEEE C62.41, Category B				

Mechanical		Units	8 Bay	12 Bay
Dimensions:	Width	In (mm)	20 (508.0)	20 (508.0)
	Depth		28 (711.2)	28 (711.2)
	Height		40 (1016.0)	53 (1346.2)

Environmental	Units				
Operating Temperature (max)	F (C)	32° - 104° (0° - 40°)			
Relative Humidity		0-95% non-condensing			
Maximum operating altitude	Ft. (M)	10,000 (3000)			
Nominal heat dissipation	BTU/Hr	1062	2124	3186	4248
Acoustic noise level	dBA	<62 @ 1 meter			

Input Data	Units	
Nominal input voltage	VAC	170 to 276
Power factor	Cos Ø	>.98
Input frequency (nominal)	Hz	60
Input frequency range	Hz	40-70

Battery Module	Units	
Number of lead acid batteries		10
Number of battery cells		60
Battery capacity	A/hr	9
Autonomy time (full load)	mins	6 (With an equal number of Battery & Power Modules, in a non-redundant configuration)
Maximum charge current (full load)	A	3
Nominal Voltage	VDC	120
Recharge Time	Hrs	3-5 (to 90% capacity)

Output Data	Units	
Output voltage	VAC	208/120 or 240/120
Voltage regulation	%	±3
Voltage stability (100% step load)	%	±7
Recovery time	msec	96
Voltage distortion:	%	<3 THD, linear load
		<7 THD, non-linear load
Output frequency	Hz	60
Efficiency at 100% load	%	89
Output overload capability	%	110-125% for 10 min
		126-150% for 10 sec
		>151 – 200% for 2 cycles

Battery Run Times

8 Bay Frame
Internal and External (minutes)

Load	Load	Quantity of Battery Modules							Quantity of External Battery Cabinets with charger					
VA	Watts	1	2	3	4	5	6	7	1	2	3	4	5	6
16,000	11,200	-	-	-	6	-	-	-	24	60	100	120	180	240
15,500	10,850	-	-	-	6	-	-	-	26	63	107	140	195	255
15,000	10,500	-	-	-	6	-	-	-	27	67	114	160	210	270
14,500	10,150	-	-	-	6	-	-	-	28	70	120	180	225	285
14,000	9,800	-	-	-	7	-	-	-	30	73	127	190	240	300
13,500	9,450	-	-	-	7	-	-	-	31	77	135	200	252	320
13,000	9,100	-	-	-	8	-	-	-	32	80	142	210	264	340
12,500	8,750	-	-	-	8	-	-	-	34	85	150	220	276	360
12,000	8,400	-	-	6	9	12	-	-	36	90	157	230	288	375
11,500	8,050	-	-	6	9	13	-	-	38	95	165	240	300	390
11,000	7,700	-	-	6	10	14	-	-	40	100	173	255	320	405
10,500	7,350	-	-	7	10	15	-	-	42	110	180	270	340	420
10,000	7,000	-	-	7	11	18	-	-	45	120	195	285	360	450
9,500	6,650	-	-	8	13	18	-	-	50	130	210	300	390	480
9,000	6,300	-	-	9	14	19	-	-	53	140	225	320	420	510
8,500	5,950	-	-	9	15	20	-	-	57	150	240	340	450	540
8,000	5,600	-	6	10	18	21	26	-	60	160	260	360	480	570
7,500	5,250	-	6	11	18	23	28	-	65	170	280	390	510	600
7,000	4,900	-	7	13	19	25	29	-	70	180	300	420	540	660
6,500	4,550	-	8	14	21	27	30	-	80	200	330	480	600	720
6,000	4,200	-	9	18	24	29	36	-	90	220	360	510	660	810
5,500	3,850	-	10	19	26	30	39	-	100	240	420	540	720	900
5,000	3,500	-	12	20	29	36	43	-	120	270	450	600	810	1,000
4,500	3,150	-	14	24	30	40	46	-	140	300	480	720	900	1,100
4,000	2,800	6	18	26	36	43	49	52	160	360	540	810	1,080	1,200
3,500	2,450	7	19	29	41	48	52	56	180	420	600	900	1,260	1,440
3,000	2,100	9	24	36	46	51	56	62	210	480	720	1,050	1,440	1,620
2,500	1,750	12	29	43	51	56	63	68	240	600	900	1,200	1,620	1,800
2,000	1,400	18	36	50	57	64	68	72	360	720	1,200	1,440	1,800	2,880
1,500	1,050	24	46	56	65	69	73	74	480	900	1,440	2,400	3,000	3,600
1,000	700	36	56	68	73	74	75	78	720	1,440	2,400	3,600	4,320	4,320
900	630	39	59	69	73	75	78	78	900	1,800	3,000	4,320	4,320	4,320
800	560	43	63	72	74	76	78	79	1,080	2,100	3,600	4,320	4,320	4,320
700	490	48	68	73	75	78	79	79	1,260	2,400	4,320	4,320	4,320	4,320
600	420	51	69	74	77	79	79	80	1,440	3,000	4,320	4,320	4,320	4,320
500	350	56	72	75	78	79	80	80	1,440	3,600	4,320	4,320	4,320	4,320

Note: Back-up times are in minutes and are based upon resistive loading at an ambient of 25°C, for non-redundant (standard) configurations. Back-up times for external battery cabinets with chargers include internal battery modules that are equal to the number of power modules in the UPS frame.

Battery Run Times

12 Bay Frame
Internal and External (minutes)

Load	Load	Quantity of Battery Modules											Quantity of External Battery Cabinets with charger					
VA	Watts	1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5	6
16,000	11,200	-	-	-	6	8	10	13	18	-	-	-	24	60	100	120	180	240
15,500	10,850	-	-	-	6	8	11	14	18	-	-	-	26	63	107	140	195	255
15,000	10,500	-	-	-	6	9	11	15	18	-	-	-	27	67	114	160	210	270
14,500	10,150	-	-	-	6	9	12	15	19	-	-	-	28	70	120	180	225	285
14,000	9,800	-	-	-	7	9	13	18	19	-	-	-	30	73	127	190	240	300
13,500	9,450	-	-	-	7	10	14	18	20	-	-	-	31	77	135	200	252	320
13,000	9,100	-	-	-	8	11	14	18	21	-	-	-	32	80	142	210	264	340
12,500	8,750	-	-	-	8	11	15	19	22	-	-	-	34	85	150	220	276	360
12,000	8,400	-	-	6	9	12	18	20	23	26	-	-	36	90	157	230	288	375
11,500	8,050	-	-	6	9	13	18	20	24	27	-	-	38	95	165	240	300	390
11,000	7,700	-	-	6	10	14	19	21	25	29	-	-	40	100	173	255	320	405
10,500	7,350	-	-	7	10	15	19	23	27	29	-	-	42	110	180	270	340	420
10,000	7,000	-	-	7	11	18	20	25	28	30	-	-	45	120	195	285	360	450
9,500	6,650	-	-	8	13	18	21	26	29	31	-	-	50	130	210	300	390	480
9,000	6,300	-	-	9	14	19	24	27	30	36	-	-	53	140	225	320	420	510
8,500	5,950	-	-	9	15	20	25	29	31	38	-	-	57	150	240	340	450	540
8,000	5,600	-	6	10	18	21	26	30	36	39	43	-	60	160	260	360	480	570
7,500	5,250	-	6	11	18	23	28	30	38	42	45	-	65	170	280	390	510	600
7,000	4,900	-	7	13	19	25	29	36	41	44	48	-	70	180	300	420	540	660
6,500	4,550	-	8	14	21	27	30	38	43	47	50	-	80	200	330	480	600	720
6,000	4,200	-	9	18	24	29	36	42	46	49	51	-	90	220	360	510	660	810
5,500	3,850	-	10	19	26	30	39	44	49	51	54	-	100	240	420	540	720	900
5,000	3,500	-	12	20	29	36	43	48	51	54	56	-	120	270	450	600	810	1,000
4,500	3,150	-	14	24	30	40	46	50	54	57	59	-	140	300	480	720	900	1,100
4,000	2,800	6	18	26	36	43	49	52	56	59	63	66	160	360	540	810	1,080	1,200
3,500	2,450	7	19	29	41	48	52	56	60	64	68	69	180	420	600	900	1,260	1,440
3,000	2,100	9	24	36	46	51	56	62	65	68	69	72	210	480	720	1,050	1,440	1,620
2,500	1,750	12	29	43	51	56	63	68	69	72	73	73	240	600	900	1,200	1,620	1,800
2,000	1,400	18	36	50	57	64	68	72	73	74	74	75	360	720	1,200	1,440	1,800	2,880
1,500	1,050	24	46	56	65	69	73	74	75	76	78	78	480	900	1,440	2,400	3,000	3,600
1,000	700	36	56	68	73	74	75	78	78	79	79	80	720	1,440	2,400	3,600	4,320	4,320
900	630	39	59	69	73	75	78	78	79	79	80	80	900	1,800	3,000	4,320	4,320	4,320
800	560	43	63	72	74	76	78	79	79	80	80	80	1,080	2,100	3,600	4,320	4,320	4,320
700	490	48	68	73	75	78	79	79	80	80	81	81	1,260	2,400	4,320	4,320	4,320	4,320
600	420	51	69	74	77	79	79	80	80	81	81	82	1,440	3,000	4,320	4,320	4,320	4,320
500	350	56	72	75	78	79	80	80	81	82	82	82	1,440	3,600	4,320	4,320	4,320	4,320

Note: Back-up times are in minutes and are based upon resistive loading at an ambient of 25°C, for non-redundant (standard) configurations. Back-up times for external battery cabinets with chargers include internal battery modules that are equal to the number of power modules in the UPS frame.

Warranty

LIMITED WARRANTY

Liebert Corporation extends the following LIMITED WARRANTY to the purchaser and to its customer (collectively referred to as the "Purchaser"): the enclosed Uninterruptible Power System (UPS) and components are free from defects in materials and workmanship under normal use, service, and maintenance FOR A PERIOD OF TWO YEARS FROM THE DATE OF ORIGINAL PURCHASE from Liebert or the Liebert dealer or retailer. THE FOREGOING WARRANTY IS THE ONLY WARRANTY GIVEN AND NO OTHER WARRANTY IS PROVIDED, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Certain aspects of disclaimers are not applicable to consumer products acquired by individuals and used for personal, family, or household purposes (as distinguished from industrial or other purposes). Local laws may not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. This warranty gives you specific legal rights, and you may have other rights, which vary according to local law.

Certain repairs or services are the responsibility of the Purchaser and the Purchaser is expected to pay for them. This warranty does not extend either to products with removed or altered serial numbers or to any losses or damages due to act of God or source external to the product, misuse, accident, abuse, neglect, negligence, unauthorised modification, alteration, or repair, use beyond rated capacity, or improper installation, maintenance, application or use, including, without limitation, use in a manner contrary to the accompanying instructions or applicable codes. WARNING: Warranty is void if the battery is allowed to discharge below the minimum battery cut-off point. The battery must be recharged every four (4) to six (6) months when not in use.

If the UPS fails to conform to the above warranty within the two-year warranty period, Liebert will repair or replace the UPS, at Liebert's option. Repairs or replacements are warranted for the remainder of the original warranty period. Purchaser, to make a warranty claim, should call to obtain a Returned Goods Authorisation number and shipping instructions. Return transportation costs to Liebert are the responsibility of the Purchaser.

"LIFE SUPPORT" APPLICATIONS

Due to the diversity of applications and considerations to be applied in each case, Liebert does not recommend or knowingly sells its products for such use.

The responsibility for risk assessment and management in applications where the malfunction or failure of the UPS could be reasonably expected to give rise to a risk of human life shall be the sole responsibility of the purchaser. Liebert accepts no liability for consequential harm in such applications.

Keeping Business in Business

Nfinity™ Power System

208 V / 240 V 60 Hz

4 to 16 kVA

U.S.A.	
Technical Service and Support	1-800-LIEBERT
Worldwide FAX tech support	+614-222-5877 option #4
Worldwide Support.	+614-841-6755 or 1-800-222-5877
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Germany	+49 89 99 19 220
Italy	+39 02 98250 324
Netherlands	+31 (0) 475 503333
E-mail	upstech@liebert.com
Web site	http://www.liebert.com

The Company Behind The Products

With over a million installations around the globe, Liebert is the world leader in computer protection systems. Since it's founding in 1965, Liebert has developed a complete range of support and protection systems for sensitive electronics:

- Environmental systems: close-control air conditioning from 1.5 to 60 tons.
- Power conditioning and UPS with power ranges from 250 VA to more than 1000 kVA.
- Integrated systems that provide both environmental and power protection in a single, flexible package.
- Monitoring and control — on-site or remote — from systems of any size or location
- Service and support, through more than 100 service centers around the world, and a 24-hour Customer Response Center.

While every precaution has been taken to ensure accuracy and completeness of this literature, Liebert Corporation assumes no responsibility, and disclaims all liability for damages resulting from use of this information or for any errors or omissions.

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